

REMARKS

These amendment and remarks are filed in response to the rejection mailed July 18, 2006. For the following reasons, this application should be allowed and the application passed to issue. No new matter is introduced by this amendment.

Claims 1-9 are pending in this application. Claims 1-9 have been rejected. Claims 1, 5, 6, and 9 have been amended in this paper.

Obviousness Double Patenting

Claim 9 was provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1 and 3-5 of copending Application No. 10/982,056 in view of Tamura et al. (U.S. Pat. Pub. No. 2002/0172862). The Examiner averred that the '056 application discloses an energy device comprising a negative active material thin film including at least two silicon thin films wherein a compound of silicon and oxide is present in the interface layer. The Examiner asserted that Tamura et al. discloses negative electrode active material that has a 10 nm thick oxide surface layer. The Examiner considered it obvious to modify the negative active material of the '056 application to include a 0.2 to 1000 nm thick silicon oxide layer to suppress the separation of the thin film from the current collector to provide an improvement of the charge-discharge cycle characteristics.

Claim 9 was provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1 and 3 of copending Application No. 10/979,637 in view of Tamura et al. The Examiner averred that the '637 application discloses an energy device comprising a negative active material thin film wherein a part of the silicon contained in the negative active material thin film is an oxide. The Examiner asserted that Tamura et al. discloses negative electrode active material that has a 10 nm thick oxide surface layer. The Examiner considered it obvious to modify the negative active material of the '637

application to include a 0.2 to 1000 nm thick silicon oxide layer to suppress the separation of the thin film from the current collector to provide an improvement of the charge-discharge cycle characteristics.

These rejections are traversed, and reconsideration and withdrawal thereof respectfully requested. Claim 9 is not obvious in view of the combination of Tamura et al. and the copending applications because Tamura et al. disclose a tin oxide surface layer, not a silicon oxide layer, as required by claim 9. Tamura et al. do not disclose a negative electrode active material having a surface layer comprising silicon oxide of 0.2 to 1,000 nm in average thickness formed on an inner layer comprising Si or an alloy containing Si, as required by claim 9. Thus, the combination of Tamura et al. and the claims of the copending applications do not suggest a non-aqueous rechargeable battery using a negative electrode active material comprising a negative electrode active material having surface layer comprising silicon oxide.

Claim Rejections Under 35 U.S.C. § 112

Claim 4 was rejected under 35 U.S.C. § 112, second paragraph, as indefinite, because it allegedly appears that the thickness of the surface layer is not determined, and the recited "a thickness" and "an average thickness" may create confusion.

Contrary to the Examiner's assertions, the claims are definite and clear. The recited "a thickness" and "average thickness" are distinct. The average thickness is the mean thickness of the surface layer, while the recited "a thickness" refers to the thickness at any specific location of the surface layer. Thus, the thickness of any specific location of the surface area is within the range of $\pm 50\%$ of the average thickness of the surface layer. Applicants submit that the present claims fully comport with the requirements of 35 U.S.C. § 112.

Claim Rejections Under 35 U.S.C. § 102

Claims 1-7 and 9 were rejected under 35 U.S.C. § 102(b) as being anticipated by Tamura et al. This rejection is traversed, and reconsideration and withdrawal thereof respectfully requested. The following is a comparison between the present invention, as claimed, and the cited prior art.

An aspect of the invention, per claim 1, is a negative electrode active material for a non-aqueous electrolyte rechargeable battery capable of absorbing/desorbing lithium comprising an inner layer comprising at least a material selected from the group consisting of Si and an alloy containing Si. A surface layer comprises silicon oxide of 0.2 to 1,000 nm in average thickness formed on the inner layer.

Another aspect of the invention, per claim 9, is a non-aqueous electrolyte rechargeable battery using a negative electrode active material capable of absorbing/desorbing lithium comprising an inner layer comprising at least a material selected from the group consisting of Si and an alloy containing Si. A surface layer comprises silicon oxide of 0.2 to 1,000 nm in average thickness formed on the inner layer.

The Examiner averred that Tamura et al. disclose a lithium secondary battery comprising a negative electrode composed of a thin film of active material containing either tin or a tin alloy with a tin oxide surface layer.

Tamura et al. do not anticipate the claimed negative electrode active material and non-aqueous electrolyte rechargeable battery because Tamura et al. do not disclose a negative electrode active material having a surface layer comprising silicon oxide of 0.2 to 1,000 nm in average thickness formed on an inner layer comprising Si or an alloy containing Si, as required by claims 1 and 9.

The factual determination of lack of novelty under 35 U.S.C. § 102 requires the disclosure in a single reference of each element of a claimed invention. *Helifix Ltd. v. Blok-Lok Ltd.*, 208 F.3d 1339, 54 USPQ2d 1299 (Fed. Cir. 2000); *Electro Medical Systems S.A. v. Cooper Life Sciences, Inc.*, 34 F.3d 1048, 32 USPQ2d 1017 (Fed. Cir. 1994); *Hoover Group, Inc. v. Custom Metalcraft, Inc.*, 66 F.3d 399, 36 USPQ2d 1101 (Fed. Cir. 1995); *Minnesota Mining & Manufacturing Co. v. Johnson & Johnson Orthopaedics, Inc.*, 976 F.2d 1559, 24 USPQ2d 1321 (Fed. Cir. 1992); *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051 (Fed. Cir. 1987). Because Tamura et al. do not disclose a negative electrode active material having a surface layer comprising silicon oxide of 0.2 to 1,000 nm in average thickness formed on an inner layer comprising Si or an alloy containing Si, as required by claims 1 and 9, Tamura et al. do not anticipate claims 1 and 9.

Applicants further submit that Tamura et al. do not suggest the claimed negative electrode active material and non-aqueous electrolyte rechargeable battery.

Claim Rejections Under 35 U.S.C. § 103

Claim 8 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Tamura et al. in view of Kusumoto et al. (U.S. Pat. Pub. No. 2003/0054252). This rejection is traversed, and reconsideration and withdrawal thereof respectfully requested.

The Examiner averred that Tamura et al. disclose a lithium secondary battery comprising a negative electrode composed of a thin film of active material containing either tin or a tin alloy with a tin oxide surface layer. The Examiner acknowledged that Tamura et al. do not teach a negative electrode active material including an amorphous Si film. The Examiner asserted that Kusumoto et al. disclose an amorphous silicon phase in the negative electrode active material. The Examiner considered it obvious to include an amorphous Si material in the negative

electrode active material of Tamura et al. to ease expansion and contraction when lithium ion is occluded and is discharged by inhibiting reduction of a negative electrode active material to fine powder and improving charge-discharge characteristics.

The combination of Tamura et al. and Kusumoto et al. does not suggest the claimed negative electrode active material because Kusumoto et al. do not cure the deficiencies of Tamura et al. Kusumoto et al. do not suggest the negative electrode active material having a silicon oxide surface layer, as required by claim 1.

The dependent claims are allowable for at least the same reasons as claim 1, and further distinguish the claimed negative electrode active material.

In view of the above remarks, Applicants submit that this application should be allowed and the case passed to issue. If there are any questions regarding this Response or the application in general, a telephone call to the undersigned would be appreciated to expedite the prosecution of the application.

To the extent necessary, a petition for an extension of time under 37 C.F.R. § 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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